Transformational Technology
Industry Use Cases
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Industry Use Cases—Artificial Intelligence (AI)

**PUBLIC SECTOR**
- Voting systems
- Land and title authenticity
- Data protection

**HIGH TECH/MANUFACTURING**
- Pre-emptive maintenance
- Intelligent manufacturing
- Demand sensing

**HEALTHCARE**
- Fraud detection
- Pattern-based cybersecurity
- Virtual nursing assistants

**FINANCIAL**
- Cross-border payments
- Identity management
- Settlement trading

**AUTOMOTIVE**
- Autonomous driving
- Driver assistance
- Vehicle-to-vehicle communication

**COMMUNICATIONS**
- Network maintenance and troubleshooting
- Dynamic resource allocation
- Customer experience

**CONSUMER GOODS/RETAIL**
- Virtual assistants
- Real-time, customer-demand predictions
- Image recognition

**EDUCATION/RESEARCH**
- Student enrollment
- Personalized learning paths
- Student success

**MEDIA/ENTERTAINMENT**
- Smart self-service media
- Personalized content
- Personalized advertising
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Industry Use Cases—Blockchain

PUBLIC SECTOR
- Voting systems
- Land and title authenticity
- Data protection

HIGH TECH/MANUFACTURING
- Compliance management
- IP management
- Product traceability

HEALTHCARE
- Claims management
- Medical traceability
- Credential validation

FINANCIAL
- Cross-border payments
- Identity management
- Settlement trading

AUTOMOTIVE
- Vehicle title management
- Counterfeit detection
- Origination validation

COMMUNICATIONS
- Roaming charges settlement
- Media and game streaming
- Security and fraud

CONSUMER GOODS/RETAIL
- Product traceability and recall
- Product authentication
- Warranty management

EDUCATION/RESEARCH
- Student records
- Digital rights management
- Learning marketplaces

MEDIA/ENTERTAINMENT
- Royalty payment distribution
- C2C/P2P content sharing
- News crowd-p2p reviewing
IOT IN AUTOMOTIVE

CRASH AVOIDANCE
Monitoring driver eye movement and raising a fatigue alarm

72,000 accidents per year in US were caused by drivers who fell asleep.

FLEET MANAGEMENT
Managing vehicle location, fuel, maintenance, and speed

8.56M fleet vehicles are in service in the US.

SMART FACTORIES
Connecting production process, which enables multiple vehicle configurations on one production line, and better informs just-in-time suppliers

US$160B is the annual expected productivity gain by 2023 from adopting smart-factory technologies.
Industry Use Cases—Internet of Things (IoT)

**IOT IN COMMUNICATIONS**

**CONNECTIVITY**
Delivering a seamless infrastructure to connect hundreds of billions of IoT devices

**DELIVERY AND MONETIZATION OF IOT SERVICES**
Becoming a one-stop IoT provider to consumers and businesses by leveraging connectivity and smartphones

**ASSET TRACKING AND REMOTE WORKER**
Managing fleets dynamically using virtual reality to remotely guide workers, and enabling consumers to track installer arrival

12B+ of all internet-connected devices worldwide by 2020 will be machine-to-machine connections. CSPs must build 5G and NB IoT networks to support growth.

US$200B is the amount of expected revenue from IoT solutions by mobile operators by 2025.

70,000 AT&T technicians will enjoy optimized scheduling and dispatching through the use of IoT for fleet management and connected worker.

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IOT IN CONSUMER GOODS/RETAIL

FRICIONLESS COMMERCE
Providing lineless, in-store shopping (e.g., Amazon Go) with downloaded apps that let you take the products you want and go

WEARABLE TECHNOLOGY
Providing users with data-input capabilities and real-time access to product/service info in a seamless fashion—smart watches, apparel, etc.

CUSTOMIZED SHOPPING
Analyzing customer traffic and intersections with loyalty schemes to offer 1:1 experiences, recommendations, and personalized services

4,320 hours is the amount of time the average consumer spends waiting in line in their lifetime.

$US150B is the projected wearable technology market by 2026.

62% of consumers said the primary motivation for shopping in stores is to see/try products before purchasing.
IOT IN EDUCATION/RESEARCH

FACILITIES MANAGEMENT
Monitoring of building and facilities remotely

350 buildings and facilities at Penn State are monitored and automated using IoT technology, saving 20% on electricity and increasing comfort and security.

PERSONALIZED STUDENT EXPERIENCE
Using location-based awareness services to suggest nearby activities or events based on student profiles and past behaviors

77% of US students think that universities should use more of their personal information to enhance their college experience.

STUDENT SECURITY
Improving campus security by providing access to buildings, events, activities, etc., through use of wearable technology

46% is the projected growth rate in wearable technology by 2020—primarily within the student-aged populations.
IOT IN MEDIA/ENTERTAINMENT

SET-TOP BOX
Monitoring, detecting, fixing issues/patterns—proactively and remotely—that are associated with set-top boxes in the home

96.5% of US homes are connected to set-top boxes.

SELF-SERVICE
Enabling customers to install and configure their set-top box using AR/VR-based install guides and remote support via video

US$100 is the average cost to install a set-top box.

SMART HOME GATEWAY
Providing a home ecosystem—media, lighting control, video surveillance, thermostat monitoring—through a set-top box

250% is the expected increase in the global smart-home market from 2017 to 2019.
IOT IN FINANCIAL SERVICES/INSURANCE

WEARABLE TECHNOLOGY
Providing devices for life and health insurance, personalized policy management, and pricing

60% of leading financial institutions plan to make wearables a main payment device as part of their IoT business strategy.

INSURANCE AS A SERVICE
Providing automotive/property and casualty insurance as a service based on usage, driving habits, and monitored risk

1.7T observations are made by Progressive using IoT-based, onboard diagnostic devices to study driver behavior and adjust insurance pricing.

TRADE FINANCE
Automating validation of shipments, goods delivery, and credit letters

12B IoT sensors can potentially be used by financial organizations by 2025.
IOT IN HEALTHCARE

REMOTE PATIENT MONITORING
Managing patients outside of clinical settings, increasing access to care, and decreasing healthcare delivery costs

US$16B is the annual US cost of hospital readmissions. Remote patient monitoring can reduce it by 50% for 30-day readmissions.

ASSET MANAGEMENT
Increasing asset utilization through locating, monitoring, and maintaining mobile medical equipment across facilities

US$11M is the cost of 383 pieces of medical equipment missing from a San Jose hospital over a four-year period.

MEDICATION ADHERENCE
Encouraging chronically ill patients to better manage their conditions to reduce the severity of their diseases

50% of patients with chronic conditions do not take medications correctly.
IOT IN HIGH TECHNOLOGY/INDUSTRIAL MANUFACTURING

SERVICE MONITORING
Monitoring connected products at a customer site to provide proactive service, automated firmware updates, and consumption-based billing

20.4B connected products will exist by 2020.

PRODUCTION MONITORING
Monitoring all aspects of connected equipment on factory floor to optimize manufacturing performance, predict issues, minimize maintenance

67% of industrial manufacturers have an ongoing smart-factory initiative.

PRODUCT INSIGHTS
Leveraging product usage data from sensors to identify potential quality issues, new product ideas, and enhancements to existing products

30% of global 2,000 companies will be using data from digital twins of IoT-connected assets to improve productivity by 2020.
IOT IN PUBLIC SECTOR

SMART CITIES
Increasing operational efficiency, reducing energy consumption, and delivering government services—while addressing citizen needs

US$45B is the expected IoT-enabled smart-building market by 2020.

TRAFFIC MANAGEMENT
Managing traffic based on patterns, flow, and accidents

65% of the population will live in cities by 2040.

SECURITY AND PUBLIC SAFETY
Improving surveillance and security through cameras, video analytics, and smart-lighting systems

US$3B+ was the global market for city surveillance equipment in 2017.
AI IN AUTOMOTIVE

AUTONOMOUS DRIVING
Enhancing self-driving/autonomous cars and connected autonomous factories

DRIVER ASSISTANCE
Providing automatic braking/parking, collision avoidance, traffic/people alerts, and adaptive cruise control

VEHICLE-TO-VEHICLE COMMUNICATION
Broadcasting vehicle position, speed, steering-wheel position, and brake status to nearby vehicles to reduce accidents

US$127B is the annual expected productivity gain by 2023 from adopting smart-factory technologies.

2020 is when autonomous emergency-braking and forward-collision warning systems are mandated in all vehicles by the EU and US.

500K accidents could be prevented in the US each year with vehicle-to-vehicle communication.
AI IN COMMUNICATIONS

NETWORK MAINTENANCE AND TROUBLESHOOTING
Identifying and resolving network equipment problems, predictive maintenance

33% of CSPs are already using AI for network management—with 51% planning to do so over the next two years.

DYNAMIC RESOURCE ALLOCATION
Allocating network resources dynamically to respond to demand fluctuation

1,000 parameters must be configured in the highly dynamic 5G network and SDN/NFV environments. AI is imperative to manage this complexity.

CUSTOMER EXPERIENCE
Creating personal customer interactions with virtual assistants that know your needs, adapt to your behavior, and are ready on your device of choice

48% of CSPs said that their main driver for implementing AI is to deliver a better customer experience.
**AI IN CONSUMER GOODS/RETAIL**

**VIRTUAL ASSISTANTS**
Combining AI with human interfaces to help customers get answers to their questions easier and faster.

- 85% of customer interactions will be managed without humans by 2020.

**REAL-TIME, CUSTOMER-DEMAND PREDICTION**
Learning/analyzing customer buying, browsing, search, and consumption data to predict purchasing decisions.

- 95% of customer experience applications will be driven by AI by 2025.

**IMAGE RECOGNITION**
Capturing/analyzing walking patterns, gaze direction, and gestures, combined with demographic profiles to adjust product marketing actions.

- 30% year-over-year revenue growth is what brands with voice and visual search functionality can expect to see by 2021.

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Industry Use Cases—Artificial Intelligence

AI IN EDUCATION/RESEARCH

STUDENT ENROLLMENT
Improving admissions by matching students to programs

US$536 per student is what public universities spend on recruiting.

PERSONALIZED LEARNING PATHS
Personalizing student experience to improve student outcomes with virtual academic advisors and tutors

45% of undergraduate students do not earn a degree within six years of matriculating into a college program.

STUDENT SUCCESS
Identifying patterns of data that predict which students could become at-risk, enabling timely and personalized interventions

#2 priority among higher-education institutions is to improve retention and graduation rates for all students.
AI IN MEDIA/ENTERTAINMENT

SMART SELF-SERVICE MEDIA
Subscribing to a complex media service without human interaction based on intelligent recommendations and bots

50% of transactions are digital today for large media players.

PERSONALIZED CONTENT
 Recommending personalized content based on data from user or similar user activity to increase customer retention

US$1B is what AI saves Netflix per year in keeping customers engaged, thereby reducing cancellations.

PERSONALIZED ADVERTISING
Delivering highly personalized digital video advertising based on specific individual preferences in a household

67% of the media industry believe highly targeted advertising has a high potential.
**AI IN FINANCIAL SERVICES/INSURANCE**

### RISK MANAGEMENT
- Profiling, predictive scenario planning/analysis/underwriting
- 88% of survey respondents see AI as a foundational change for risk management.

### FINANCIAL PLANNING
- Providing financial advice/online investment management via robo-advisors across multiple asset classes
- 50%+ of digital leaders are already using AI to increase productivity for wealth and asset management.

### FRAUD PREVENTION
- Facilitating financial institutions in know-your-customer and anti-money laundering screening
- 40%+ is the fraud rate for corporate cards—many sellers on the black market will back up the cards they sell with a reimbursement guarantee.
AI IN HEALTHCARE

FRAUD DETECTION

Recognizing patterns to identify unusual claim activity and fraud

US$68B is the amount healthcare fraud costs the US each year.

PATTERN-BASED CYBERSECURITY

Increasing security of protected health information by identifying patterns in attempted cyberattacks and suspicious login attempts

89% of healthcare organizations have experienced a data breach that involved patient data being stolen or lost.

VIRTUAL NURSING ASSISTANTS

Assessing patient symptoms remotely and alerting clinicians when patient care is needed—reducing unnecessary hospital visits

10X is how much more treatment provided during an emergency visit costs compared to similar care provided on an outpatient basis.
AI IN HIGH TECHNOLOGY/INDUSTRIAL MANUFACTURING

PRE-EMPTIVE MAINTENANCE
Predicting equipment maintenance problems to maintain service levels/operations and improving manufacturing processes

38% increase in manufacturers’ adoption of machine learning and analytics to improve predictive maintenance is predicted over the next five years.

INTELLIGENT MANUFACTURING
Discovering patterns to predict yield and product defects early in the manufacturing cycle, and tracing products to analyze impacts

30% improvement in semiconductor manufacturing yields by reducing scrap rates and optimizing fab operations is achievable with machine learning.

DEMAND SENSING
Increasing forecast accuracy with intelligent segmentation and demand sensing using downstream data

20–50% reduction in forecasting errors is feasible with machine learning. Lost sales due to inadequate supply can be reduced by up to 65%.

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Industry Use Cases—Artificial Intelligence

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AI IN PUBLIC SECTOR

CITIZEN ENGAGEMENT
Implementing chatbots to make it easier and faster for citizens to receive assistance to a question or report an issue

50% reduction in email when Los Angeles Business Assistance Virtual Network deployed a chatbot on its website.

CRIME PREVENTION
Providing predictive policing to maintain safe communities

2X is how much more accurate an AI-infused mathematical model was at pinpointing crime hotspots versus professionals with machine learning.

FLOOD PREVENTION
Creating an early-warning, flood-management system to improve public safety and environmental destruction

90% of all US natural disasters declared by the president involve flooding.
**BLOCKCHAIN IN AUTOMOTIVE**

**VEHICLE TITLE MANAGEMENT**
Authenticating and tracking of vehicle titles

- **500K** cars were flood-damaged after Hurricane Katrina—many were title-washed.

**COUNTERFEIT DETECTION**
Eliminating counterfeit car parts, which is costly and unsafe

- **US$45B** is the estimated global loss to motor vehicle suppliers from counterfeit parts.

**ORIGINATION VALIDATION**
Validating and verifying supplier component sourcing

- **62.5%** of North American content for autos is required by NAFTA to be duty-free.

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**BLOCKCHAIN IN COMMUNICATIONS**

### ROAMING CHARGES SETTLEMENT

Accelerating and reducing the cost of clearing roaming charges between carriers via blockchain-backed TAP files

*125M* roaming consumers exist today with 750M roaming IoT devices expected by 2025.

### MEDIA AND GAME STREAMING

Lowering transaction costs and increasing transparency in developing new product offerings with partners

*58%* of consumers subscribed to a streaming service in 2017—with more than 50M Netflix subscribers in the US alone.

### SECURITY AND FRAUD

Assuring the integrity of downloadable software from public portals to prevent code injection

*79%* of cyberattacks in 2017 were injection-type attacks—up from 42% in 2016.
**PRODUCT TRACEABILITY AND RECALL**

Tracing contaminated products in the food supply chain and accelerating product recalls

**PRODUCT AUTHENTICATION**

Ensuring consumers are buying authentic goods

**PRODUCT TRACEABILITY AND RECALL**

48M Americans get sick from food-borne pathogens each year.

US$461B worth of fake goods are imported annually worldwide.

**WARRANTY MANAGEMENT**

Providing records of every item on which a warranty has been offered, including claims tracking and potential future costs

3–15% of all warranty claims are fraudulent for the majority of companies each year.

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Industry Use Cases—Blockchain

BLOCKCHAIN IN **CONSUMER GOODS/RETAIL**
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Industry Use Cases—Blockchain

BLOCKCHAIN IN EDUCATION/RESEARCH

STUDENT RECORDS
Capturing, authenticating, and storing student-owned, lifelong-learning records—including badges, credentials, degrees, and certifications

111 graduates from MIT were the first to receive digital diplomas via smartphone app based on blockchain technology in 2017.

DIGITAL RIGHTS MANAGEMENT
Enabling secure publication, distribution, and content tracking—including rights management—in digital libraries and scholarly publications

145% is the cost increase to Harvard over the past six years for access to academic journals.

LEARNING MARKETPLACES
Creating an on-demand distributed learning ecosystem into a seamless network where students can earn/transact tokens of educational value

23M students signed up for a massive open online course (MOOC) for the first time in 2017.

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**Industry Use Cases—Blockchain**

**BLOCKCHAIN IN MEDIA/ENTERTAINMENT**

**ROYALTY PAYMENT DISTRIBUTION**
Capturing precise end user content consumption/usage based on smart contracts

90% of royalty reviews uncover underreported revenues due to clerical errors, accounting mistakes, or contract misunderstandings.

**C2C/P2P CONTENT SHARING**
Monetizing content sharing and usage through micropayments

72% of minors and 51% of adults in the EU have illegally downloaded or streamed some form of creative content.

**NEWS CROWD-PEER REVIEWING**
Creating super users to validate information via reputable peer-reviewer users to create “wisdom of the crowd”

70% is the likelihood of falsehoods versus true facts that will be retweeted on Twitter.
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Industry Use Cases—Blockchain

**BLOCKCHAIN IN FINANCIAL SERVICES/INSURANCE**

**CROSS-BORDER PAYMENTS**

- Streamlining and simplifying payments with fast, secure transactions and less-complex auditing

- **40%** of global payments transactional revenue comes from cross-border payments—accounting for more than US$135 trillion in 2016.

**IDENTITY MANAGEMENT**

- Standardizing identity management processes and know-your-customer requirements through permissioned shared ledgers, smart contracts, consensus, and privacy capabilities

- **US$2.5B** is the annual cost of identity theft to consumers, banks, and credit-card firms in Canada alone.

**SETTLEMENT TRADING**

- Facilitating/shortening settlement of financial instruments among trusted trading partners and providing greater trade accuracy

- **US$2–7B** could be derived by reducing settlement of syndicated loans from 20-plus days to 6-10 days using smart contracts.
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Industry Use Cases—Blockchain

BLOCKCHAIN IN HEALTHCARE

CLAIMS MANAGEMENT
Streamlining the claims adjudication process

20% of claims require six or more rounds of reworking.

MEDICAL TRACEABILITY
Increasing recall efficiency, identifying quality events, and ensuring authenticity of drugs/devices

4,500 drugs and devices are recalled annually—with approximately 10% having the potential to cause harm or death.

CREDENTIAL VALIDATION
Verifying qualifications of licensed medical professionals and assessing their background and legitimacy

85% of applications are missing critical information required for credentialing of medical professionals.

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Industry Use Cases—Blockchain

BLOCKCHAIN IN HIGH TECHNOLOGY/INDUSTRIAL MANUFACTURING

**COMPLIANCE MANAGEMENT**
Confirming product compliance and checking for products from embargoed and/or conflict zones

90% of companies submitting conflict minerals are not able to ensure compliance.

**IP MANAGEMENT**
Providing a secure IP registry to increase efficiency of patent process

US$100B in IP losses were incurred when products were “stolen” by thieves using 3D printers.

**PRODUCT TRACEABILITY**
Tracking product genealogy, production process assurance, and identifying counterfeit products across the value chain

84% of high tech companies outsourced some portion of their supply chain—with one in four subcontracting out more than half of their manufacturing processes.

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BLOCKCHAIN IN PUBLIC SECTOR

VOTING SYSTEMS
Securing mobile voting systems
1,132 proven cases of voter fraud, 983 convictions, and 48 civil penalties.

LAND AND TITLE AUTHENTICITY
Securing land-ownership records
480% increase in wire-fraud scams was reported by title companies in 2016.

DATA PROTECTION
Protecting the digital identity of citizens, to include crime victims, witnesses, and defendants
US$239M in suspect tax refunds due to identity theft was paid out by the IRS in 2016.